

REMARKS

The added claims and amendments above are supported by the specification and no new matter has been added. The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

Election/Restrictions

The Examiner has restricted claims 31-33 and 44-54 as directed to an invention that is independent or distinct from the invention originally claimed. Accordingly, claims 31-33 and 44-54 have been withdrawn from consideration as being directed to a non-elected invention.

Applicants remind the Examiner that the restriction must be withdrawn if a generic claim is found to be allowable. Currently, at least claims 30, 35, and 38 are generic.

35 U.S.C. §103(a) Rejection - Long in view of Heung

The Examiner has rejected claims 30, 34-43 and 55-60 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,702,491 issued to Long et al. (hereinafter referred to as “Long”) in view of U.S. Patent No. 6,267,229 issued to Heung (hereinafter “Heung”). Without admitting that Long and Heung should be combined, the Applicants respectfully submit that the present claims are allowable over any combination of Long and Heung.

Claim 30 recites an apparatus comprising “*a first compartment including an endothermic hydrogen generator; a second compartment coupled with the first compartment, the second compartment including an exothermic hydrogen generator to transfer net heat to the endothermic hydrogen generator; and a fuel cell coupled to the*

generators to receive hydrogen and to generate electrical power”. Long does not teach or suggest this claimed apparatus.

(1). Long

First, let’s discuss Long. As understood by Applicants, Long discusses a thermally insulated container, such as a dewar, to contain the primary chemical hydride 14. This is discussed in Long at column 3, row 63, through column 4, line 3:

“FIG. 1 shows a hydrogen generator 10 embodying the invention. Hydrogen generator 10 includes a thermally isolated container 12, such as a vacuum insulated, multiple wall dewar similar to a cryogenic dewar, containing a primary chemical hydride 14, preferably a metal hydride, such as, for example, lithium aluminum hydride (LiAlH₄). Primary chemical hydride 14 undergoes both hydrolysis and thermal decomposition reactions to generate hydrogen (H₂).

As understood by Applicants, the primary chemical hydride is contained in a single inner vessel. This is discussed in the SUMMARY OF THE INVENTION of Long at column 2, rows 25-30:

“In preferred embodiments of the invention, the container comprises a dewar having an outer shell and an inner vessel defining an evacuated space therebetween, and having an insulating material positioned in the evacuated space, wherein the first chemical hydride is placed within the inner vessel.”

As understood by Applicants, a single inner vessel to contain the primary chemical hydride is also used in Figs. 3-4. As discussed in Long at column 8, rows 49-60:

“As shown in FIGS. 3 and 4, container 12 comprises a thermally isolated dewar having an outer shell 24 and an inner vessel 26 which combine to define a vacuum space 27 therebetween. ... The generation of hydrogen by hydrogen generator 10 primarily occurs in inner vessel 26 of container 12, wherein the primary chemical hydride 14 (preferably LiAlH_4) is contained.”

Accordingly, as understood by Applicants, Long does not teach or suggest an apparatus comprising *“a first compartment including an endothermic hydrogen generator; a second compartment coupled with the first compartment, the second compartment including an exothermic hydrogen generator to transfer net heat to the endothermic hydrogen generator”*.

(2). Heung

Now, let's discuss Heung. As understood by Applicants, Heung discusses a container having a solid hydrogen storage medium, and having dividers to partition the container into chambers, and thereby apparently prevent the storage medium from migrating. This is discussed in Heung in the SUMMARY OF THE INVENTION, at column 2, lines 6-16 as follows:

*“A solid storage medium, like metal hydride in a ground particle form, may be used to hold hydrogen. The storage medium is placed within a container. **Dividers partition the container into chambers (emphasis added).** A matrix, formed from a thermal foam or other appropriate materials and placed within the container, improves heat transfer and holds the solid hydrogen storage medium in separate cells. Although the storage medium may migrate somewhat among cells, **the dividers prevent the storage medium from migrating into a different chamber (emphasis added).**”*

The same solid hydrogen storage medium appears to be used in each of the chambers. The medium appears to absorb heat (be endothermic) when desorbing hydrogen, and release heat (be exothermic) when absorbing hydrogen. This is discussed in Heung at column 5, line 66 through column 6, line 13.

“properly heated fluid 40 flowing through the conduit 22 causes or assists hydrogen desorption as heat transfers through the conduit walls 23, conducts through matrix 26 to various cells 27 and, ultimately, transfers to the solid storage medium, causing it to desorb hydrogen. ... Circulating a coolant fluid 40 through conduit 22 will draw out the resulting generated heat, speeding and improving the hydrogen absorption process.”

Accordingly, Heung does not teach or suggest an apparatus comprising a first compartment including an endothermic hydrogen generator; a second compartment coupled with the first compartment, the second compartment including an exothermic hydrogen generator to transfer net heat to the endothermic hydrogen generator.

(3) Long in view of Heung

Even if Long and Heung are combined, which does not even seem appropriate, there is still no teaching or suggestion of a first compartment including an endothermic hydrogen generator; a second compartment coupled with the first compartment, the second compartment including an exothermic hydrogen generator to transfer **net** heat to the endothermic hydrogen generator. As understood by Applicants, if the material of Leung were placed in the chambers of Heung, the same quantity of heat would be exchanged from one chamber to another and the net heat transfer between chambers would be zero.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. **Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

For at least these reasons, claim 30 and its dependent claims are believed to be allowable over any combination of Long and Heung. Independent claims 35 and 58 and their dependent claims are also believed to be allowable.

Conclusion

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

Request For Telephone Interview

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

Request For An Extension Of Time

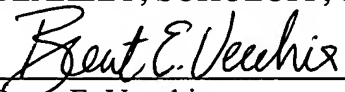
The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

Charge Our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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